

of lightning protectors. The use of double wires diminishes the danger to a minimum. On the Continent and in America, however, telephones are invariably protected by lightning arresters where one wire only is used.

There are certain natural currents flowing through the crust of the earth. They are called "earth" currents, and at times acquire such considerable energy, that, with a telephone pressed to each ear, I have been told, although I have not experienced it, that the noise made is as though "your brains were boiling." This is due to the intermittent currents produced by the polarisation of the earth plates.

M. Van Rysselbergh has recently spoken between Paris and Brussels upon a wire nearly 200 miles long, which was used at the same time for ordinary telegraphy, but the experiment was made early in the morning (4 a.m.), and was effected by retarding the telegraphic currents, so as to modify the suddenness of their rise and fall, by means of condensers and electro-magnets. I am unable to understand the advantage of any gain in speaking on a wire which is detrimental to telegraphic communication. Speed is of more importance than speech, and we can telegraph much faster than we can speak. In England speed is everything and we eliminate every influence that retards speed—condensers and electro-magnets in telegraphy circuits are out of the question. M. Van Rysselbergh has endeavoured to extend the idea to cure the effects of induction by destroying the main cause of the disturbance—that is, by reducing the sudden rise and fall of the prime telegraphic currents; but to do this means to retard telegraphy, and we cannot afford in England to cripple the one system in order to benefit the other.

I have recently tried an extremely interesting experiment between this place (Southampton) and the Isle of Wight, namely to communicate across seas and channels without the aid of wires at all. Large metal plates were immersed in the sea at opposite ends of the Solent, namely, at Porthsmouth and Ryde, six miles apart, and at Hurst Castle and Sconce Point, one mile apart. The Portsmouth and Hurst Castle plates were connected by a wire passing through Southampton, and the Ryde and Sconce Point plates by a wire passing through Newport; the circuit was completed by the sea, and signals were passed easily so as to read by the Morse system, but speech was not practical.

The telephone is very rapidly gaining ground, and, as improvements are effected in its accessories, in its installation, and in its mode of working, its use will still further extend. In Germany it is used very extensively for telegraphic business, there being 1,280 stations worked entirely by telephones, but in England it is not possible in the numerous open and public shops employed as Post Offices to secure that privacy which the telephone requires nor have we yet got over our early prejudices, resulting from the errors made through the inability of the instrument in its earlier form to repeat the sibilant sounds. The instruments of the present day (thanks to the improved transmitters), however, transmit "s's" perfectly.

WILLIAM HENRY FREECE

#### SCIENTIFIC SERIALS

*Journal of the Franklin Institute*, September.—On a newly discovered absolute limit to economical expansion in the steam-engine and in other heat-motors, by R. H. Thurston.—Observations with the platinum-water pyrometer, with heat-carriers of platinum and of iron encased with platinum, by J. C. Noadley.—The microscope in engineering work, by R. Grimshaw.—Tests of double raw hove belts, by J. E. Hilleary.—Greatest ringing bells, by J. W. Nystrom.—Report on European sewage-systems, with special reference to the needs of the City of Philadelphia, by R. Hering.—Emerson's power scales, or dynamometer, by J. H. Lord.—Mechanical modifications of the Bessemer plant necessary to adapt it to the economical working of the basic process, by W. M. Henderson.—Prevention of fires in theatres (continued), by C. J. Hexamer.

*Bulletin de l'Academie Royale des Sciences de Belgique*, No. 7.—On the seat of thunderstorms and their origin, by W. Spring.—On the compound ethers of hyposulphurous acid, and on some organic bisulphides, by W. Spring and E. Legros.—On the brominated derivatives of camphor, by M. Swarts.—Note concerning the priority of the discovery of a relation existing between dilatability and fusibility, by P. De Heen.

*Journal de Physique*, July.—On the condition of achromatism in the phenomena of interference, by A. Cornu.—On the same,

by A. Hurion.—On the actinic transparency of some media, and in particular on the actinic transparency of Foucault mirrors and their application in photography, by J. de Chardonnet.—On methods for determination of the ohm, by G. Lippmann.—Apparatus for regulating the flow of a gas at any pressure, by J. Ville.

*Reale Istituto Lombardo di Scienze e Lettere. Rendiconti*. Fasc. xii.-xiii.—New method for determining the relative internal conductivity of metals for heat, by G. Poloni.—On the theory of systems of electrified conductors, by E. Beltrami.—On the pseudofocus of the paraboloid and on the magnetic centre, by G. Jung.—Contribution to the experimental study of hypnotism in hysterics, by A. Tanburini and G. Seppilli.

Fasc. xvi.—New microtelephonic system, by C. Fornioni.—The crystalline group of Albigna and Disgrazia; stratigraphical and chemico-lithological studies, by E. Bonardi.—On syphilitic reinfection, by A. Scarenzio.—Luni-solar influence on earthquakes, by A. Serpieri.—Contribution to the general physiology of smooth muscles, by E. Sertoli.—The plague of Milan in 1576 and Cardinal Borromeo, by A. Corradi.

*Atti della Accademia dei Lincei; Transunti*. Fasc. xiv.—On the circulation of blood in the human brain, by S. Mosso.—On the microscopical fauna of the Zarclean limestone of Palo, by S. Terrigi.—Internal equilibrium of metallic piles according to the laws of elastic deformations, by S. Allievi.—On the graduation of galvanometer, by Signor Canestrelli.—On the influence of hygroscopic condensation on glass in determination of the density of aqueous vapour, by Signors Macaluso and Grimaldi.—The action of oxygenated water on the system, by Signors Capranica and Colasanti.—On two isomeric acids, santonic and isantoniosic, by Signor Cannizzaro.—On some products of transformation of glutaric or normal pyrotartaric acid, by Signor Bernheimer.—Action of nascent hydrogen on pyrrol, by Signors Ciamicini and Dennstedt.—On some derivatives of hexahydro-naphthaline, by Signor Agrestini.—On two volumes of autograph drawings of the two brothers Cherubino and Giovanni Alberti, by Signor Cannizaro.—New Carthaginian inscription to Fanith and Baal-Hammon.—Ephemerides and hydrometric statistics of the River Tiber during 1881, by Signor Bettocchi.—On the anatomy of leaves (continued), by Signor Briosi.—On the first phenomena of development of *salpa*, by Signor Todaro.—Statistics of the popular banks existing in Italy in the end of 1880, by Signor Bodio.—First outlines of a statistic of the conditions of life of operatives, by the same.—The diminution of illiterates in Italy, by the same.—On the Comet Wells, by Signor Respighi.—On the total eclipse of May 7, 1882, by the same.

#### SOCIETIES AND ACADEMIES SYDNEY

*Linnean Society of New South Wales*, June 28.—Dr. James C. Cox, president, in the chair.—The following papers were read:—Half century of plants new to South Queensland, by the Rev. B. Scortechini. This paper was to some extent a continuation of a previous paper by the same author, and contained the results of further researches on the flora of that part of the country. Among the plants enumerated were many hitherto regarded as strictly tropical, while others had not previously been observed in such warm latitudes.—Contribution to a knowledge of the fishes of New Guinea, by the Hon. William Macleay, F.L.S., &c. This paper gives a list of 120 species of Percoid Fishes collected by Mr. Andrew Goldie at Port Moresby and Cuppa-Cuppa, in New Guinea. They are, with few exceptions, species which have been described by Dr. Bleeker as being found on the northern shores of that island and throughout the Netherlands India Archipelago generally. The new species described are *Serranus Goldiei*, *Serranus magnificus*, *Genyoroge bidentatus*, *Mesopristis rubens*, *M. parvidens*, *M. Goldiei*, *Diagramma Papuense*, *Lethrinus aurolineatus*. The remainder of Mr. Goldie's collection is to form the subject of a future paper.—A monograph of the Australian Aphroditacean annelids, by Mr. W. A. Haswell.—Two papers were read by Mr. E. P. Ramsay, F.L.S., Curator of the Australian Museum, one containing a description of a new species of *Phlogena* (*P. Salamonis*) and of a new species of *Dicrurus* (proposed to be called *D. longirostris*) from the Solomon Islands; the other containing a description of a new species of *Coris* from Lord Howes' Island.—Prof. W. J. Stephens exhibited a few specimens of a lost *Euc-*

*Eucalyptus* which had been lately re-discovered by his brother, Mr. T. Stephens, in the immediate neighbourhood of Hobart. He stated that the plant (*Eucalyptus cordata*) had only once been seen by botanists since the expedition of d'Entrecasteaux, and then only in two isolated and remote spots.

## PARIS

Academy of Sciences, September 4.—M. Blanchard in the chair.—The following papers were read:—Solution, in finite and simple terms, of the problem of longitudinal shock, by any body, of an elastic bar fixed at the unstruck extremity, by M. de Saint Venant.—On the figure of comets, by M. Faye. In this whole question, apparently so complicated, there is merely (he says), the play of solar attraction tending to decompose bodies of very small mass and large volume, and that of solar repulsion (due to incandescence) which begins to act on the evaporable part of those materials, when, freed from all pressure and subject to increasing heat, they commence to form nebulosities of excessive rarity.—On *trombes* observed on the sea at Etretat, by M. Lalanne. The phenomena described, comprising *douze* *trombes*, occurred in September, 1851. M. Faye explains them on his theory.—On the distribution of heat in the dark regions of solar spectra, by M. Desains. He gives here his observations with prisms of crown-glass and flint (the previous were with rock-salt). The spectrum is prolonged much further on the side of the rays of great wave-length, than with rock-salt. M. Desains describes an apparatus, for determining, conveniently and surely, the angular distance of any line of the luminous spectrum from one of the cold bands of the dark spectrum.—M. Alph. Milne-Edwards announced that the *Travaileur* had returned from its cruise in the Bay of Biscay, to the west of Spain and Morocco, to Madeira and the Canaries.—Typhoid fever in Paris; period of 1875 to 1882, by M. de Pietra-Santa. In the first half of this year the deaths from typhoid fever in Paris were 4·60 per cent. of the total deaths (in 1865-7 they were only 1·90 per cent., in 1875, 2·30 per cent.). The fever has most victims in April and in November. Its distribution is unequal in the several arrondissements. There is no direct and constant relation between the number of deaths from it, and the number of the population in the arrondissement, the surface, the density of population, and the general mortality. Medical statistics, with clinical observation, prove the impossibility of referring typhoid fever to a single cause, the fecal origin assigned by the English school.—Theoretical and practical consideration on the phenomena of electro-magnetic induction; application to the more common types of machines, by M. de Tromelin.—Action of helenine on the bacillus of tuberculosis, by M. de Korab. Helenine seems adverse to the development of the organism.—On the syphilitic bacterium; syphilitic development in the pig, by MM. Martineau and Hamonie.—On the problem of Kepler, by M. de Gasparis.—Oscillation-balance employed for calculation of moments of inertia, by M. Brassinne.—Researches on the absorption-spectrum of the terrestrial atmosphere, by M. Egoroff. These were carried out at the Paris Observatory with M. Thollon, the electric and other light being sent from Mont Valérien, Montsouris, &c. Details of the spectra are given.—Experimental study of the reflection of actinic rays; influence of specular polish, by M. de Chardonnet. Every surface reflects in variable proportions each of the spectral radiations. The reflecting power of a liquid is independent of the substances it holds in solution or suspension. Specular polish increases the total quantity of radiations reflected, while the relative intensity of different regions of the spectrum depends on the matter employed.—On the law of cooling, by M. Rivière. He observed the cooling of a platinum wire heated by an electric current in dry air, within a glass cylinder, on which flowed a current of cold water. The wire's temperature was deduced from the variations of its conductivity, and the quantity of heat lost (equal to that developed by the current), calculated by Joule's law. The results are compared with those got from the formulae of Dulong and Petit and of Rossetti. (The formula of the former is shown, as by other physicists, to give too rapid increase.)—On the law of thermal constants of substitution, by M. Tommasi.—On some combinations belonging to the group of creatinines, by M. Duvillier.—Researches on the circulatory apparatus of regular sea-urchins, by M. Kehler.—On the innervation of the mantle of some lamellibranch molluscs, by M. Vialleton.—On the intestinal parasites of the oyster, by M. Certes.

September 11.—M. Blanchard in the chair.—Reference was made to the death of M. Liouville, Member, and M. Planta-

mour, Correspondent. (Funeral discourses on the former, by MM. Faye and Laboulaye, are printed in *Comptes Rendus*).—On the mean temperature of the northern and southern hemispheres of the earth, by Mr. Hennessy. There is reason to believe that the idea of a superiority of temperature of the northern hemisphere over that of the southern must be given up. Mr. Henel considers the southern hemisphere, with its greater mass of water, to have (if anything) the higher temperature, or about 15°.4 C. Herr Hann considers that 15°.2 C. represents the temperature of both hemispheres. Mr. Hennessy views with satisfaction the removal of a difficulty in his theory of climates put forth many years ago.—On the extension of the phylloxera at Beziers in vineyards not submitted to treatment, by M. Henne-guy.—Means of combating the disease of the vine, by M. Maistre. He has had good results from applications of greasy water (from washing of sheep's wool) every fifteen days, besides sulphocarbonate of potassium.—Conditions for two linear differential equations without second member to have  $\neq$  common solutions; equations giving the solutions, by M. Lemonnier.—Natural definition of differential parameters of functions, and especially of that of the second order  $\Delta_2$ , by M. Boussinesq.—Observations of the solar spectrum, by Mr. Langley. This relates to the results of the Mount Whitney expedition. *Inter alia*, it is estimated, that, our atmosphere apart, the solar rays would raise about 3 deg. C. 1 gr. of water in one minute, for each square centimetre of the earth's surface exposed normally to them. Of the total energy which vivifies the world, only a quarter occurs in the visible spectrum and the ultra-violet; the other three quarters exist in the great infra-red region, whose extension has been so erroneously conceived. The general telluric absorption, at least in dry climates, diminishes to the extreme infra-red. In general, in both atmospheres (the earth's and the sun's), the absorption increases (except in interruptions noted) as the wave-length diminishes. The absolute colour of the photosphere is blue. The maximum energy in the visible spectrum is in the orange.—On the various causes of etiolation of plants, by M. Mer. He inquires into these by a comparison of the phenomena of aquatic plants with those of aërial plants grown in the dark or in moist air.—On a new amputation of an upper limb, by M. Després. For disease of the omoplatus this bone was removed, with the arm and part of the clavicle.—Signor Govi presented a small work giving six unpublished letters of Galileo; also a memoir describing experiments in transformation of electricity of tension into voltaic currents. The latter were made in ignorance of the previous experiments of M. Bichat. With a small Holtz machine Signor Govi decomposed water, getting in three minutes 1 cc. of explosive mixture; with the same current he vibrated a Froment siren, produced magnetic spectra, obtained very bright sparks by interruption with a steel file, lit an arc between carbons, and actuated a Rhumkorff coil.

## CONTENTS

## PAGE

PSYCHOLOGICAL DEVELOPMENT IN CHILDREN. By Dr. GEORGE J. ROMANES, F.R.S. . . . .	497
SCLATER'S "JACAMARS AND PUFF-BIRDS" . . . . .	499
OUR BOOK SHELF:—	
Radcliffe's "Illustrated Essay on the Noctuidæ of North America, with 'a Colony of Butterflies'" . . . . .	500
Stack's "Six Months in Persia."—A. H. KEANE . . . . .	500
Vinter's "Notes on Chemical Calculations, with Examples" . . . . .	501
Miss Ridley's "Pocket Guide to British Ferns" . . . . .	501
LETTERS TO THE EDITOR:—	
A Meteorological Spectroscope.—Col. J. F. D. DONNELLY, C.B., F.R.S. . . . .	501
The New Comet.—A. A. COMMON . . . . .	501
Contact Makers of Delicate Action.—Prof. S. H. HULE SHAW (With Illustration) . . . . .	501
Bobbers.—Prof. H. N. MOSELEY, F.R.S. . . . .	502
PROFESSOR HAECKEL IN CEYLON, V. . . . .	502
A SOLAR PRINTING PRESS (With Illustration) . . . . .	503
NOTES ON THE AYE-AYE OF MADAGASCAR. By REV. R. BARON . . . . .	504
THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE . . . . .	505
PROFESSOR PLANTAMOUR . . . . .	505
ON SIR WILLIAM THOMSON'S GRADED GALVANOMETERS. By ANDREW GRAY (With Illustrations) . . . . .	506
NOTES . . . . .	509
OUR ASTRONOMICAL COLUMN:—	
Cometary Discoveries . . . . .	511
The Total Solar Eclipses of 1883 and 1885 . . . . .	512
GEOGRAPHICAL NOTES . . . . .	512
UNWRITTEN HISTORY, AND HOW TO READ IT. By JOHN EVANS, D.C.L., LL.D., F.R.S., &c. . . . .	513
RECENT PROGRESS IN TELEPHONY. By WILLIAM HENRY PREECE, F.R.S. . . . .	516
SCIENTIFIC SERIALS . . . . .	519
SOCIETIES AND ACADEMIES . . . . .	519